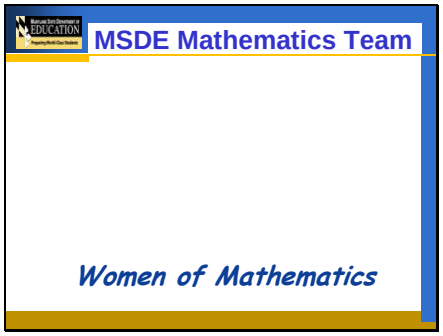
Slide 1

Welcome to the Mathematics Webinar designed as a follow-up from this summer's Educator Effectiveness Academy.

First, let me begin by thanking you for being a Mathematics leader at your school. Your participation in the academy this past summer and today's Webinar are very important as we look forward to reforming Maryland.

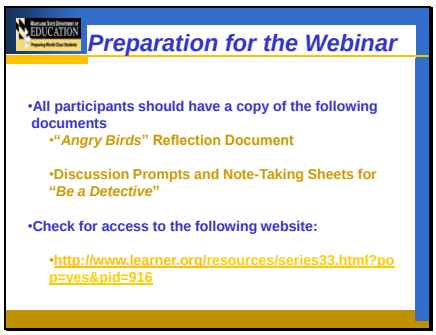
Slide 2



I would like to take a minute to introduce the specialists who have worked on this project, as well as all our other projects in Mathematics for Race To The Top, for Instruction and for Assessments.

Bette Kundert is the elementary Mathematics specialist concentrating on PreK-4. Marci Frye works at middle school. She's a middle school specialist focusing on grades 5 and 6. Karen Ross is also a middle school specialist and she leads our grades 7 and 8 work. High School is lead by Linda Kaniecki. She is our high school specialist. Additionally to our Race To The Top funds we have also hired Sara Reed who works side-by-side with Marci and Karen at middle school. Debbie Ward who is partners with Linda for the High School project. I'm Donna Watts. I have the privilege of being the Coordinator of Mathematics. My job focuses on policy and outreach for the department. Most importantly my job is to assist and provide guidance to the specialist working in Mathematics.

Slide 3



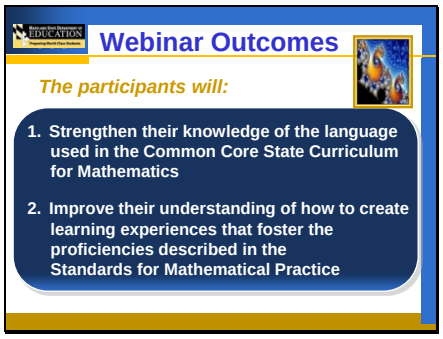
This Webinar is intended to produce additional professional development on the Common Core State Standards for Mathematics. In an attempt to make this a more user friendly experience, we have developed several interactive activities. These activities make use of several websites and word documents.

Before proceeding, please make sure you have copies of the activity sheets for the "*Angry Birds*" and "*Be a Detective*".

You will also need access to the website listed below. If you haven't confirmed access or you don't have these documents please PAUSE now and restart when you're ready.

http://www.learner.org/resources/series33.html?pop=yes&pid=916

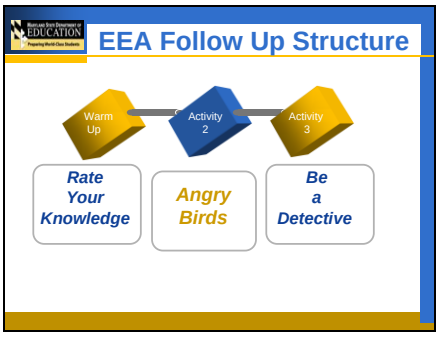
Slide 4



This slide lists the outcomes for the activities in this Webinar. The rationale for why we selected the stated outcomes is based on an important point made by David Sousa in his book "How the Brain Learns Mathematics." Sousa discusses the fact that repeated practice, distributed over time is the key to retention.

Our hope is that the activities provided in this Webinar will help educators retain, and even extend what they already know about the Common Core State Standards.

Slide 5



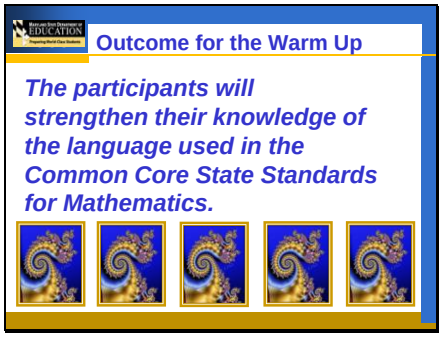
The Mathematics Webinar is divided into 3 distinct parts: a warm up activity and two other activities. In order to accommodate your busy professional schedules, we have created this Webinar in such a way that it can be viewed in one long session or in 2 to 3 shorter sessions. We hope this flexibility allows you to participate in and benefit from each session as fully as possible.

The warm up activity is a fun trivia game aimed at reviewing the structure and language of the Common Core State Standards.

Activity 2 is based on the wildly popular video *Angry Birds*. Now, I'll bet you are already wondering how a video game could possibly connect to Common Core? Especially to the Standards for Mathematical Practice!!! You'll simply have to be patient and stay tuned!!!

Activity 3, *Be a Detective*, is in response to the often-expressed request from Mathematics educators around our State to be provided with visual examples of student behaviors that indicate both teacher and student engagement in the Standards for Mathematical Practice.

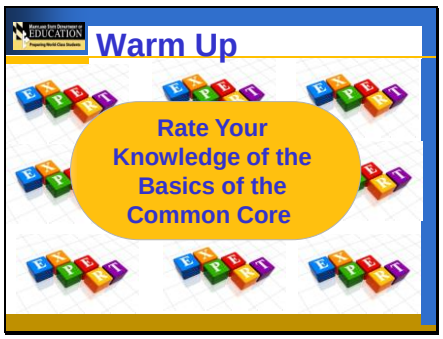
Slide 6



Let's now turn to the warm up activity. The outcome is noted on your screen.

The participants will strengthen their knowledge of the language used in the Common Core State Standards for Mathematics.

Slide 7



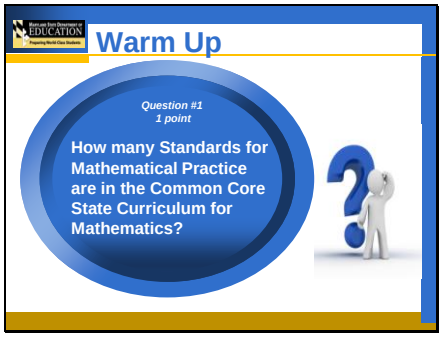
Ok, Trivia Enthusiasts. It's time to put on your thinking caps.

Before starting, everyone should get a piece of paper or a white board where you can record answers to nine questions. For extra enjoyment challenge yourself by competing with colleagues who are with you now to see who can accumulate the most points! You know games are fun!!

Every trivia question is appropriately timed for your response. The answers will be shared after a few seconds, so you can check your work. Then the Webinar will automatically go on to the next question. The trivia questions vary in difficulty, and therefore, are worth various point values. Award yourself points as appropriate for each question you answer correctly.

So let's get started and see how you stack up!!!

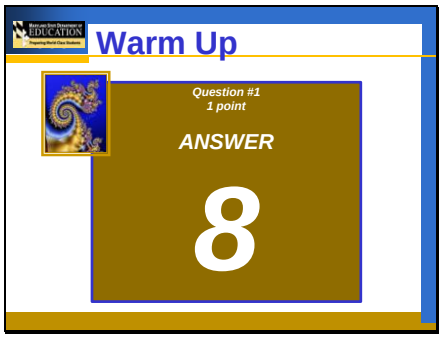
Slide 8



Ok, question #1 is worth 1 point.

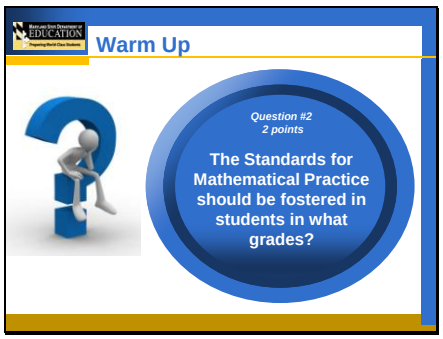
How many Standards for Mathematical Practice are in the Common Core State Curriculum for Mathematics?

Slide 9



That's right 8! I bet everyone got that one right. If you did you got 1 point.

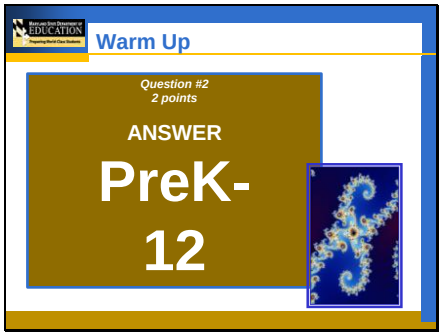
Slide 10



Ok, question #2 worth 2 points.

The Standards for Mathematical Practice should be fostered in students in what grades? Umm!

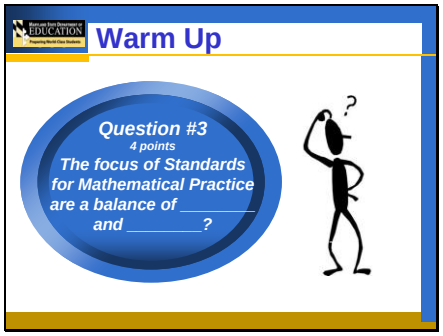
Slide 11



Pre K through 12.

If you got that right add 2 points to your score.

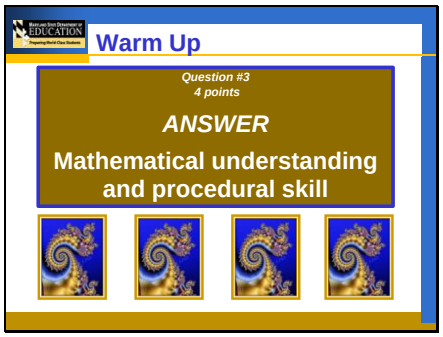
Slide 12



Question #3, worth 4 points. Whoa!!

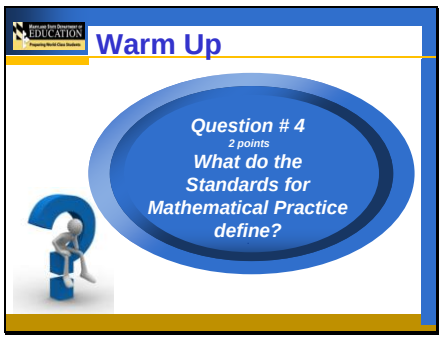
The focus of Standards for Mathematical Practice are a balance of _____ and _____?

Slide 13



For 4 points Mathematical understanding and procedural skills.

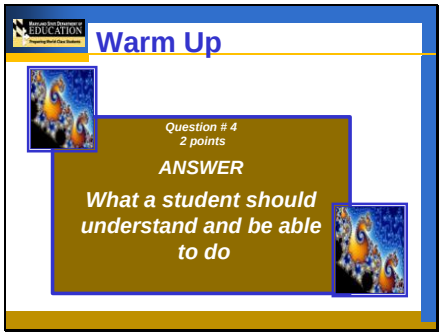
Slide 14



Hey question #4, worth 2 points.

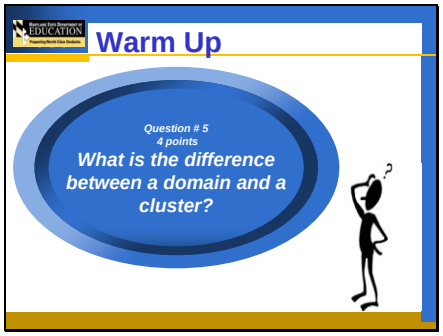
What do the Standards for Mathematical Practice define?

Slide 15



Ok, What a student should understand and be able to do.

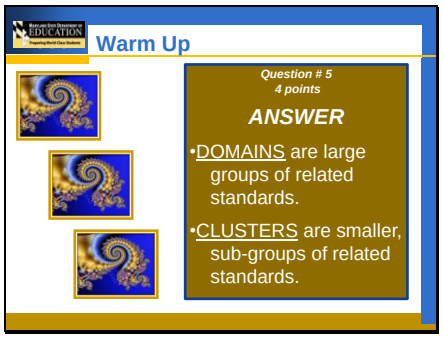
Slide 16



Question #5, Whoa a big 4 points for this one.

What is the difference between a domain and a cluster?

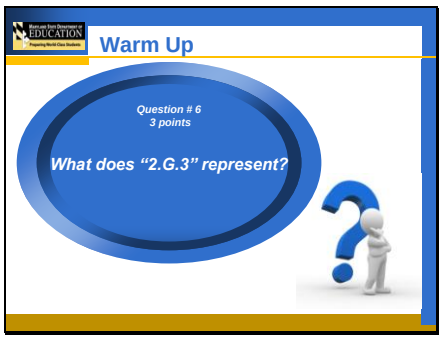
Slide 17



A “Domain” is a large group of related standards. Where a “Cluster” is a smaller sub-group of related standards.

4 points if you got that one!

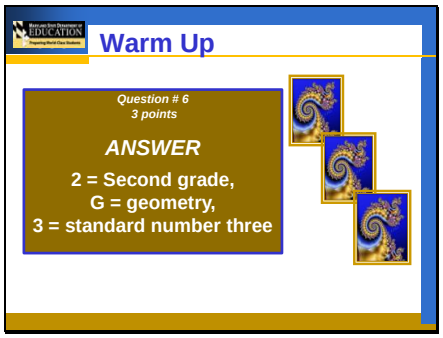
Slide 18



Question #6

What does "2.G.3" represent?

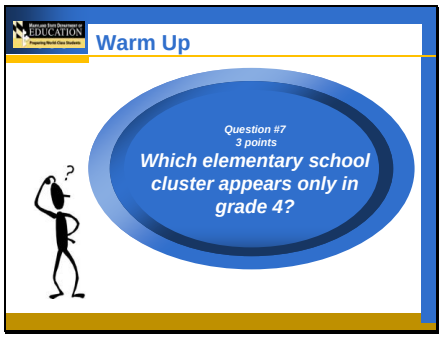
Slide 19



That's right!!

2 = Second grade
G = Geometry
3 = Standard number three in Geometry

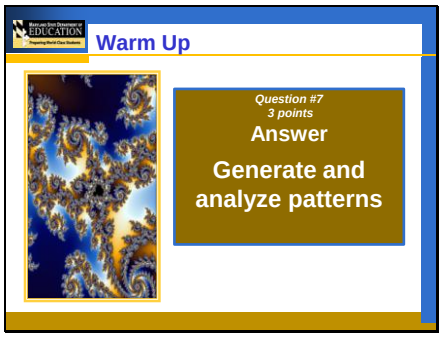
Slide 20



Question #7, worth 3 points

What elementary school cluster appears only in grade 4?

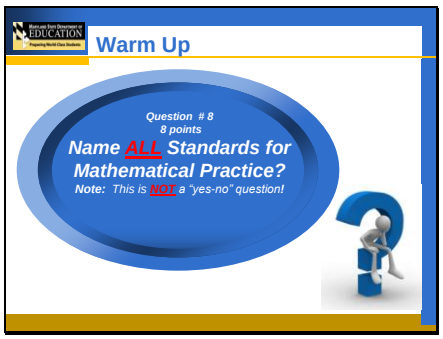
Slide 21



The answer for 3 points is to generate and analyze patterns.

That's a shocker for all of us I think!

Slide 22

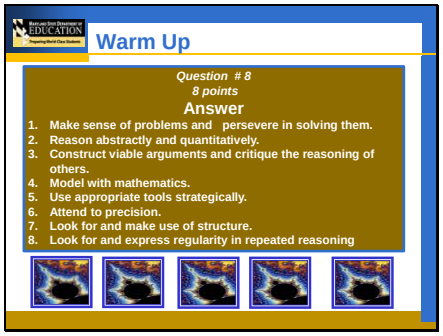


Question #8

Name ALL Standards for Mathematical Practice? Notice this is worth 8 points because it's NOT a "yes or no" question!

Can you name all 8?

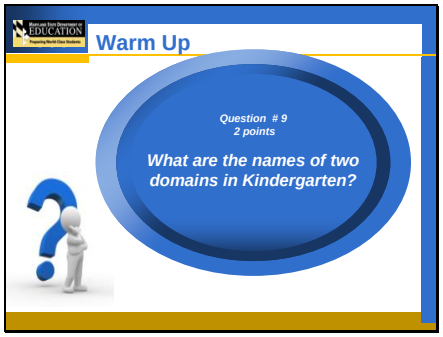
Slide 23



Ok, and the 8 are for 8 points, 1 point each.

- Make sense of problems and persevere in solving them
- Reason abstractly and quantitatively
- Construct viable arguments and critique the reasoning of others
- Model with Mathematics
- Use appropriate tools strategically
- Attend to precision
- Look for and make use of structure
- Look for and express regularity in repeated reasoning.

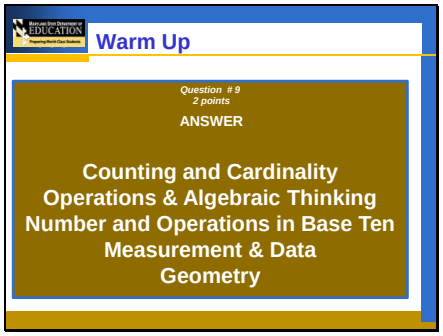
Slide 24



And question #9 for 2 points.

What are the names for two domains in Kindergarten?

Slide 25

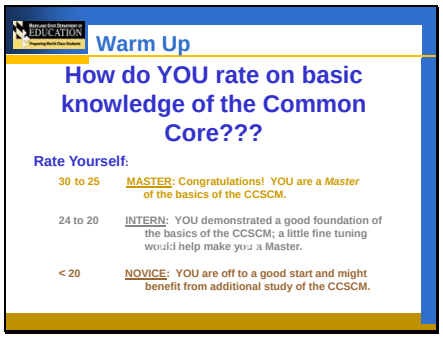


And you can get any 2 of the 4.

1. Counting and Cardinality
2. Operations and Algebraic Thinking
3. Number and Operations in Base Ten
4. Measurement and Data
5. Geometry

So there are 5 choices there from which you need 2.

Slide 26

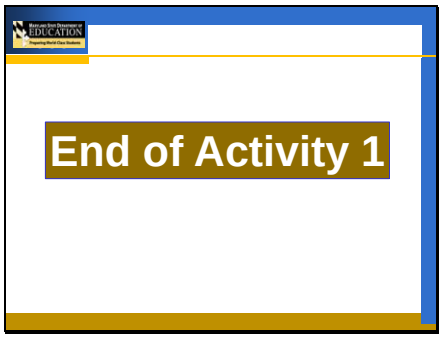


Ok, so how did you do? Did you win the Gold Medal, the Silver medal or the Bronze medal? Are you a Master? And Intern? Or a Novice? Regardless of your score, keep up the good work.

30-25 Master! Congratulations! YOU are a Master of the basics of CCSCM.
24-20 Intern! YOU demonstrated a good foundation of the basics of CCSCM; a little fine tuning would help make you a MASTER.
<20 Novice! You are off to a good start and might benefit from additional study of the CCSCM.

And we will all keep growing with the Common Core State Standards.

Slide 27



This is the end of the first activity. If you are planning to watch this in 3 sessions, this is a good place to stop the Webinar.

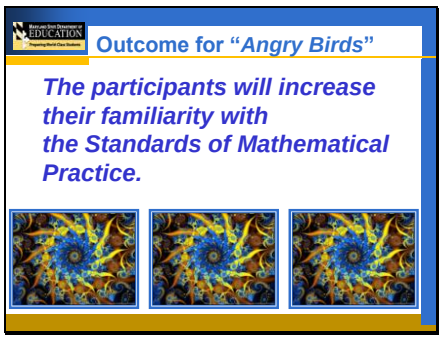
Otherwise let's keep going!!

Slide 28

Welcome to the second activity.

This activity is designed to help you continue your growth in understanding of the Standards for Mathematical Practice. You will have an opportunity to connect between these Standards and comments expressed on Dan Meyer's blog entitled "Five Lessons on Teaching from Angry Birds that Have Nothing Whatsoever to do with Parabolas. Even though this activity has nothing to do with parabolas it does have a lot to do with the Standards for Mathematical Practice!

Slide 29



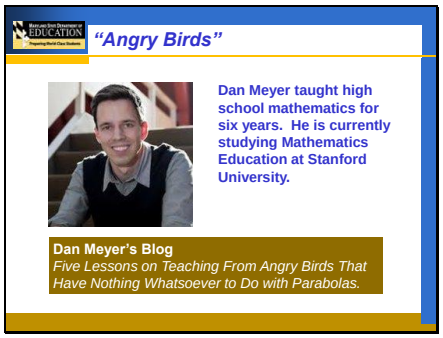
Many of the activities from this past summer's Educator Effectiveness Academies targeted the Standards for Mathematical Practice.

Local school systems have been encouraged to begin implementing these Standards during the current school year.

Because this is a new initiative, Maryland educators may be at different stages of developing a deep understanding of the Practices. Readiness with the Practices, influence the types and quality of learning experience that educators should incorporate into daily lessons.

This activity was designed as a reflective activity. To make it more engaging, we are using the video game *Angry Birds* as a starting point.

Slide 30

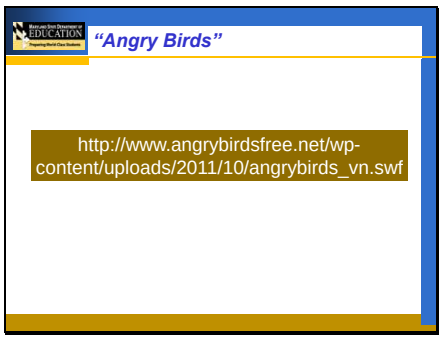


One of the final activities at the Academy last summer was to watch and reflect on a video of Mathematics teacher, Dan Meyer, "The Math Classroom Needs a Makeover."

Today, we are going to call on Dan once again. He has graciously allowed us to share his thoughts on the importance of the game Angry Birds to enhance student proficiencies in the Standards for Mathematical Practice.

Through a post on his Blog, Dan uses *Angry Birds* to encourage a discussion among educators that focuses on what they can learn about teaching by analyzing the design of this video game.

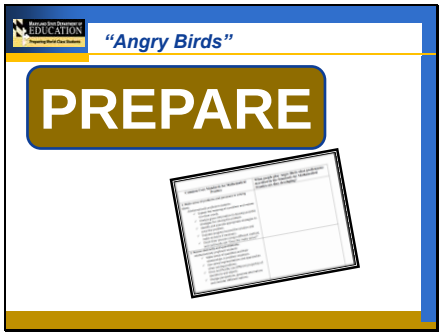
Slide 31



If you're not familiar with *Angry Birds* you might want to PAUSE the Webinar and take a few minutes to visit the *Angry Birds* site and get to know the game.

http://www.angrybirdsfree.net/wpcontent/uploads/2011/10/angrybirds_vn.swf

Slide 32



Also, make sure you have a copy of the *Angry Birds Reflection* document before you begin this activity.

Slide 33

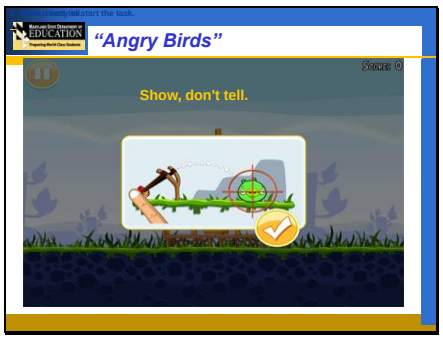
In these next few slides we suggest what a teacher might do with an activity to make Mathematics more accessible to students. After that we will ask you to determine how an activity like *Angry Birds* creates an environment that enables students to engage the Standards for Mathematical Practice.

Mr. Meyer has shared a number of observations about *Angry Birds* which are applicable to the tasks you assign your students, though the applications will vary from class to class and concept to concept.

Notice, there's a huge button in the middle "Play." By contrast, how often do your students look at their assignment and say, "I don't know what I'm supposed to be doing".

The first observation here highlights the importance of making a task easy to start.

Slide 34

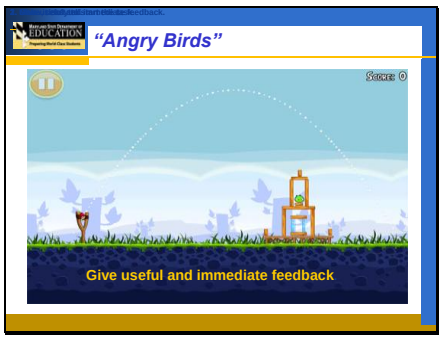


Angry Birds was designed in Finland. The game is sold all over the world. That creates an enormous design challenge.

Imagine you had to make Mathematics clear to students who don't speak any English. How many students would be successful in your class?

Therefore, when we work with students we need to remember to **show**, not just **tell** how.

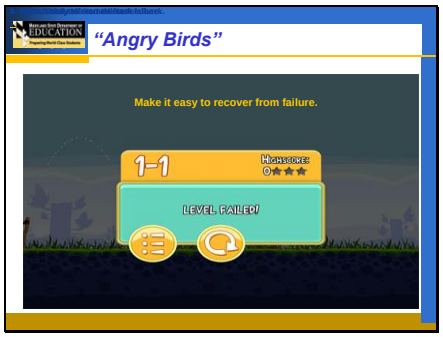
Slide 35



The importance of feedback, not just parabolic motion, is what we should learn from the trails the birds leave behind. When you miss, you can easily re-adjust. The trails help you quickly learn the power of the slingshot and the mass of the birds.

What kind of feedback do we offer students while they're learning Mathematics? Is it useful and immediate, or vague and delayed?

Slide 36



And finally, after your birds get defeated, you only have to experience failure as long as it takes you to press the huge undo arrow. Once you're successful, that's ALL the game remembers. Your losses aren't stored anywhere. They are not weighted against your successes when the game tallies your final score.

Slide 37

Message #5 Is a little bit different.

You're always flinging birds at pigs. As you master one kind of bird, though, you get new ones with different capabilities. The levels get harder. You can get away with a lot of imprecision in early levels but later on you have to be accurate down to a few pixels. This all happens gradually, with enough overlap that you head into each new task with a sense of confidence and determination.

As educators, do we properly scaffold learned experiences to allow student to develop a strong foundation upon which to build future learning?

Slide 38

Now it's time for you to do some work.

While Dan Meyer's message gives us something to think about when we reflect on our teaching practices, we want to look at *Angry Birds* and other video games in another way.

Reflect on behaviors displayed by a person when playing a video game over and over again in an attempt to conquer each level.

For Activity 2, we would like you to use the Angry Birds reflection sheet to record your thoughts about how the behaviors displayed by a person attempting to beat a video game connect to the proficiencies described in the Standards of Mathematical Practice.

Slide 39

A sample response is shown in column 2 of the table displayed on this slide.

There are many, many responses. The entries on this slide just serve to offer an example of what we would like you to produce.

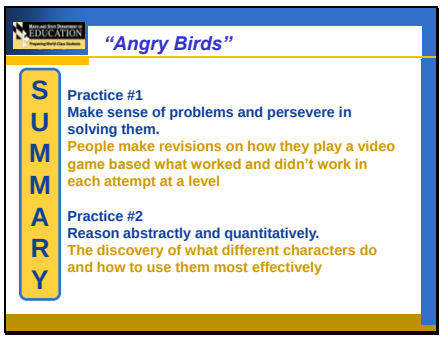
Slide 40

When all of the participants in your group have had an opportunity to complete the reflection sheet, please take time to have each participant share his/her thoughts.

To summarize, participants should share how the design of the learning experiences that they provide for students could parallel the positive aspects of video game design.

Please *PAUSE* the Webinar now for your discussion.

Slide 41



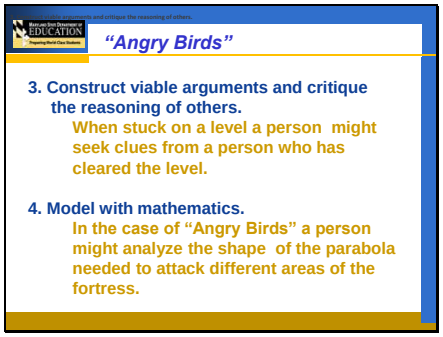
Knowing that some viewers of this Webinar might be alone, we wanted to provide a few sample responses to consider.

This slide offers a few connections for Practices 1 and 2. Please take a moment to look at this slide and the next 3 slides for some of our ideas.

Practice #1
Make sense of problems and persevere in solving them.
People make revisions on how they play a video game based what worked and didn't work in each attempt at a level.

Practice #2
Reason abstractly and quantitatively.
The discovery of what different characters do and how to use them most effectively.

Slide 42

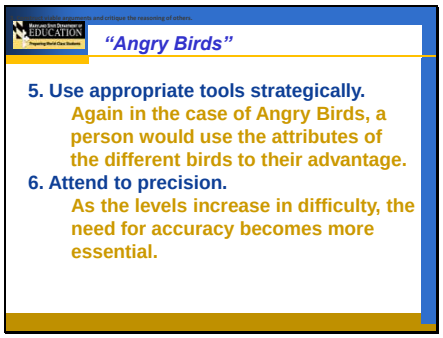


Practice # 3
Construct viable arguments and critique the reasoning of others.
When stuck on a level a person might seek clues from a person who has cleared the level.

Practice #4
Model with Mathematics.
In the case of "Angry Birds" a person might analyze

the shape of the parabola needed to attack different areas of the fortress.

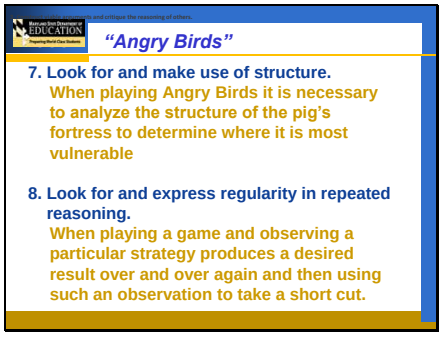
Slide 43



Practice #5
Use appropriate tools strategically.
Again in the case of Angry Birds, a person would use the attributes of the different birds to their advantage.

Practice #6
Attend to precision.
As the levels increase in difficulty, the need for accuracy becomes more essential.

Slide 44



Practice #7
Look for and make use of structure.
When playing Angry Birds it is necessary to analyze the structure of the pig's fortress to determine where it is most vulnerable.

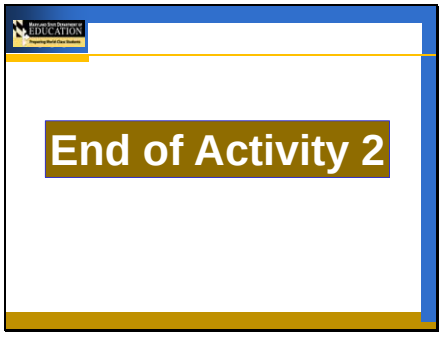
Practice #8
Look for and express regularity in repeated reasoning.
When playing a game and observing a particular strategy produces a desired result over and over again and then using such an observation to take a short cut.

Slide 45

People who play video games for an extended length of time, certainly persevere. They try the game over and over again each time taking lessons from what they learned when they failed to conquer a level. As can be seen from *Angry Birds*, we can grow in our mathematical thinking and problem-solving ability through real-life experience and EVEN games.

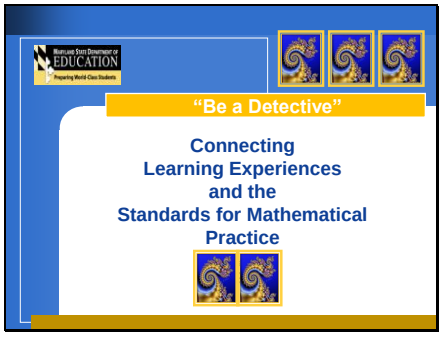
Often, the game structure provides an environment of support that leads to confidence and new knowledge. In fact, it is that type of environment in which the Standards for Mathematical Practice are valuable tools that when implemented promote success.

Slide 46



This is the end of the second activity. If you are watching the Webinar in sections, this is a good place to stop.

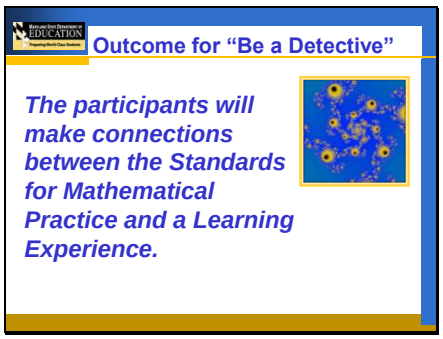
Slide 47



This is the final activity of the Webinar.

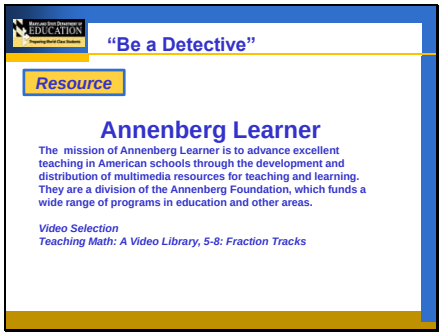
You will watch a video from the Annenberg Foundation in order to make connections between the Standards for Mathematical Practice and an actual classroom learning experience.

Slide 48



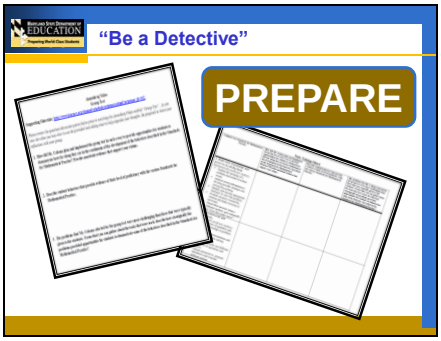
During this activity the participants will make connections between the Standards for Mathematical Practice and this sample Learning Experience.

Slide 49



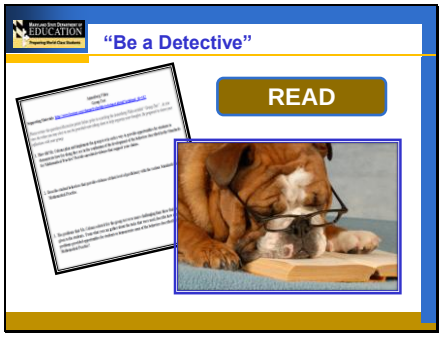
The resource for this activity is from the Annenberg Foundation's video library. Its entitled "Fraction Tracks".

Slide 50



Before beginning this activity, be sure each participant has a copy of the two documents you will need*: Fraction Tracks* discussion prompts and the sheets for taking notes.

Slide 51



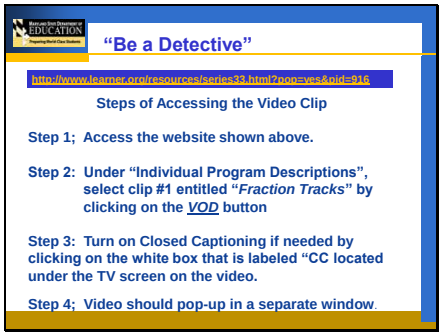
Please read the three discussion prompts prior to watching the Annenberg Video entitled "Fraction Tracks." As you view the video you may elect to use the provided note taking sheet to help organize your thoughts. Be prepared to share your reflections with your group.

This lesson is aligned to the Common Core Standards for grades 3 and 4. If you are a teacher in grades K-2, think about how you could adapt this lesson activity to use with whole numbers.

Slide 52

As you watch the video, you can answer those three discussion prompts.

Slide 53



To access the appropriate clip

- Go to the website displayed on the slide

As you watch this video clip look at what the teacher is doing, what the students are doing and how the task is structured. Make note of how various interactions provide evidence of a connection to the Standards for Mathematical Practice.

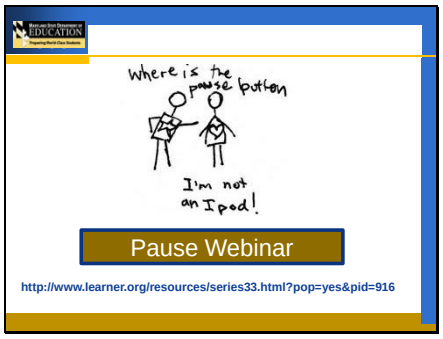
You'll notice that there are steps to access the video clip. When you go to that website: **http://www.learner.org/resources/series33.html?pop=yes&pid=916 .**

You will look on the right side for the title Individual Program Descriptions and select Clip #1 entitled "Fraction Tracks" by clicking on the VOD button.

If you need close caption you will click the white box that is labeled CC located under the TV screen on the video.

The video will pop-up in a separate window.

Slide 54



Please *PAUSE* the Webinar while you watch the video.

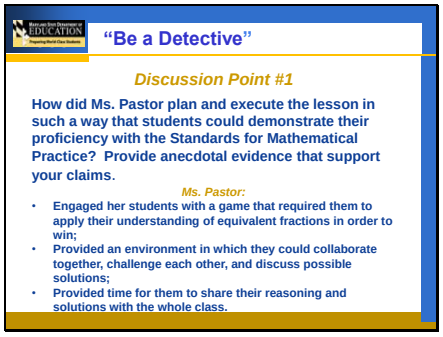
Remember as you watch the video answer the three prompts from the "Fraction Tracks" note taking sheet.

Slide 55

Discuss your reactions to the video and responses to the three prompts.

PAUSE NOW!!

Slide 56



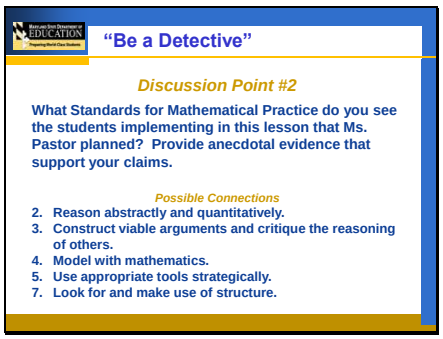
Discussion Point #1: What was it that the teacher did in executing the lesson in a way that the students could demonstrate their proficiencies with the Standards for Mathematical Practice.

There are three points here that you may have suggested of Ms. Pastor:

- That she engaged her students with a game that required them to apply their understanding of equivalent fractions in order to win;
- That she provided an environment in which they could collaborate together, challenge each other, and discuss possible solutions;
- That she provided time for them to share their reasoning and solutions with the whole class.

You certainly may have discovered many other points to bring up under discussion point #1. These are just a few samples.

Slide 57



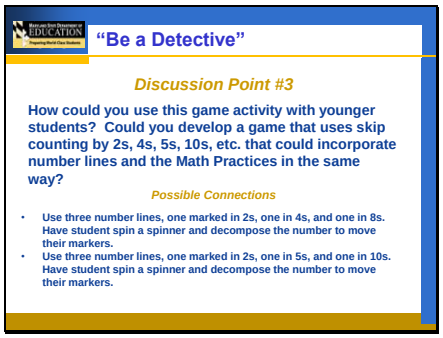
When we look at Discussion Point #2:

You can see some of the practices listed there:

1. Reason abstractly and quantitatively.
2. Construct viable arguments and critique the reasoning of others.
3. Model with Mathematics.
4. Use appropriate tools strategically.
5. Look for and make use of structure.

These are some that you may possibly have listed that you saw the students applying to this activity and there are certainly others you could have included as well.

Slide 58



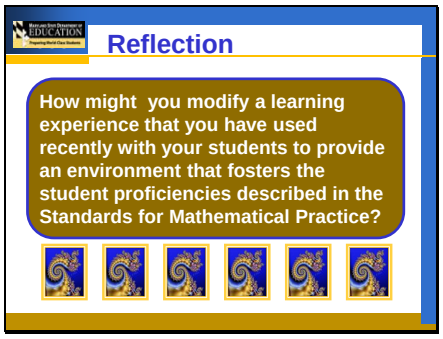
And the last question Discussion Point #3.

How could we apply this or use this activity for younger children?

One of the possible suggestions that you may have come up with is to apply it to skip counting. Where the students have number lines skip counting by 2, and number line skip counting by 4, and by 8, or possibly 2's, 5's and 10's or any combination thereof. Where they played the game using or breaking down the number into a variety of skip counting possibilities.

I am sure that you have a lot better ideas than we came up with and we would love for you to share them with us.

Slide 59

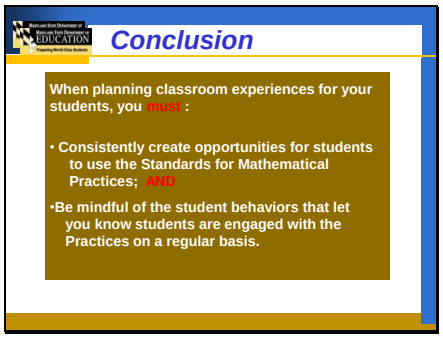


So the big question is, How might you modify a learning experience that you used recently with your students or one that you may be thinking about to provide an environment that fosters the students proficiencies with the Standards for Mathematical Practice? Based on this experience that you've seen, How might that help you to think about how to adapt some of your lesson activities?

At the end of the modified classroom experience, how did you know or how would you know that the students had depended on or used the practices? What evidence would you want to gather as proof? What student behaviors would you expect to see that would allow you to declare your lesson a success with the practices?

After reflecting for a while, share with someone sitting next to you. Or jot down your thoughts on paper about how you might adapt lessons.

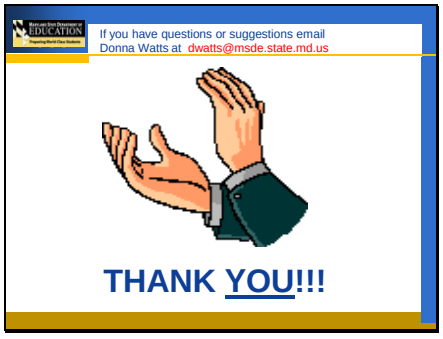
Slide 60



As we have seen from the video, the classroom learning experiences we create must be a conscious effort to make sure students have daily opportunities to grapple, persevere, critique their own work and that of peers, justify their reasoning, synthesize new information, come to conclusions, model, apply abstract thinking to specific scenarios, and various other proficiencies discussed in the eight Standards for Mathematical Practices.

Having the students apply these standards will make the lessons engaging and active and a great opportunity for learning for our students.

Slide 61



Thank you for joining the MSDE Mathematics Team in this first follow-up Webinar for Mathematics. Please know how much we value the work you do with students and your colleagues to include in instruction in Mathematics in Maryland. We hope that this Webinar not only refreshed your memory from this summer's Educator Effectiveness Academy but also added to your knowledge of the Common Core State Standards.

So what happens next?

Another follow-up Webinar is in the works and will be available approximately April 2012. We will keep you

posted.

In addition, the “Women of Mathematics” are busily planning and preparing for the second round of Maryland Educator Effectiveness Academies to be conducted throughout the State during the Summer, 2012.

If you have any suggestions to improve this Webinar or the Summer academy experience or would like to suggest and activity that we might want to consider, please email me at the address at the top of the slide.

Today’s Webinar is now finished. Those of us in the office of Mathematics again would like to thank you for your dedication to the teaching and learning of Mathematics in Maryland.